

ART. XV. THE AMPHIBIANS OF THE PULTZER
ANGOLA EXPEDITION

BY KARL PATTERSON SCHMIDT, ASSISTANT CURATOR OF REPTILES,
FIELD MUSEUM OF NATURAL HISTORY

INTRODUCTION

The collection of frogs and toads made in the course of the Pulitzer Angola Expedition in 1930 and 1931, by Mr. and Mrs. Ralph Pulitzer and Mr. and Mrs. Rudyerd Boulton, amounts to 442 specimens, representing seventeen species. The reptiles of this expedition have been reported upon in a previous paper by myself (Schmidt, 1933), which includes a map of Angola with the collecting stations of the expedition indicated.

While no new forms are represented in the collections listed below, the number of references to synonymy, of revivals of names previously placed in synonymy, and of extension of range of forms well-known in East Africa or in the Katanga, is sufficient to indicate the important place of the Angolan fauna in the elucidation of the taxonomic and distributional relations of the African forms. The large collections made by Messrs. Rudyerd Boulton and Herbert Lang for the American Museum of Natural History, on the Vernay Angolan Expedition, in 1925, are still unreported.

The taxonomic maze in the African frog fauna presented by the genus *Hyperolius* with its hundreds of species, can be clarified only by the combination of work in field and laboratory exemplified in the collections made by Mr. H. B. Cott (1932) in Mozambique and reported upon by himself and Mr. H. W. Parker (1931). It may be added that experience with the similarly difficult genus of American frogs *Eleutherodactylus* points to the fact that many of the species will prove immediately distinguishable by attention to their voices in the breeding season.

SALIENTIA

PIPIDÆ

1. *Xenopus petersii* Bocage

Xenopus petersii Bocage, 1895, Herp. Angola, p. 187.

Xenopus poweri Hewitt, 1927, Rec. Albany Mus., 3, p. 413, pl. 24, fig. 3.

Twenty-five specimens, Carnegie Museum Nos. 6601-6612, 6892-6893, Gauca, Jan. 8-10, 1931; and 6699-6701, 6724-6728, 6852, 7010-7011, Chitau, Jan. 11-15, 1931.

These specimens are all very heavily marbled with black beneath, and are readily distinguishable by this character from *Xenopus lævis lævis*. The largest specimen, No. 6601, measures 78 mm. from snout to vent, and the smallest 23 mm. Juvenile specimens all exhibit a striking dorsal pattern of ocellar spots, which tend to become obscure in the adults.

I have no hesitation in referring Hewitt's *Xenopus poweri* from Northern Rhodesia to the Angolan *petersii* in view of the normal east-west range of Angolan savanna forms south of the rain forest. (Schmidt, 1919, p. 447, map 6; 1933, p. 10).

BUFONIDÆ

2. *Bufo regularis regularis* (Reuss)

Bufo regularis Reuss, 1834, Mus. Senck., 1, p. 60.

Bufo regularis regularis Loveridge, 1932, Occ. Papers Boston Soc. Nat. Hist., 8, p. 53.

Seventy-three specimens, Carnegie Museum Nos. 6613-6645, 6671-6673, 6681, 6685, 6689, 6897-6904, Gauca, Jan. 2-10, 1931; 6658-6666, 6694, 6809-6820, Chitau, Jan. 12-16, 1931; 7027, Angola, 1931.

I follow Loveridge, (1933, p. 354) in referring the *Bufo regularis* of Angola to the typical subspecies, on the ground of geographical probability.

RANIDÆ

3. *Rana fuscigula angolensis* Bocage

Rana angolensis Bocage, 1866, Journ. Sci. Lisboa, 1, p. 54.

Rana fuscigula angolensis Loveridge, 1933, Bull. Mus. Comp. Zool., 74, p. 362.

Seventy-two specimens and seven lots of tadpoles and transforming juvenile specimens, Carnegie Museum Nos. 6670, 6676, 6686-87, 6894-95, 7020, Gauca, Jan. 5-10, 1931; 6690-93, 6705-7, 6719, 6739-53, 6762, 6764, 6766-82, 6796-6808, 6821, 6826, 6834, 6856-61, 6869, 6874, 6891, Chitau, Jan. 12-15, 1931; 7024, 7028, Angola, 1931.

4. *Rana mascareniensis subpunctata* Bocage

Rana subpunctata Bocage, 1866, Journ. Sci. Lisboa, 1, p. 54.

Rana anchietæ Bocage, 1867, Proc. Zool. Soc. London, 1867, p. 843, fig. 1.

Rana porosissima Steindachner, 1867, Reise, Novara, Amphib., p. 18, pl. 1, fig. 9.

Rana mascareniensis uzungwensis Loveridge, 1932, Bull. Mus. Comp. Zool., 72, p. 384.

Five specimens, Carnegie Museum No. 6647, Gauca, Jan. 8, 1931; 6714, 6763, 6823, 6825, Chitau, Jan. 12-16, 1931.

I have applied the oldest Angolan name to these frogs, whose final definition will require the study of abundant material and comparison with the types. The specimens at hand agree excellently with the description and figure of *Rana anchietæ*. Angola is included by Loveridge in the range of *uzungwensis*, and it is clear that if this is correct, one of the names based on Angolan material must be employed; a paratype of *uzungwensis* from Tanganyika Territory in Field Museum agrees excellently with the Angolan frogs. In the small series at hand two specimens have the spots of the posterior surfaces of the thighs confluent into well-defined stripes.

5. *Rana oxyrhyncha* Smith

Rana oxyrhynchus Smith, 1849, Illus. Zool. S. Africa, 3, pl. 77, fig. 2.

Thirteen specimens, Carnegie Museum Nos. 6704, 6757-61, 6765, 6822, 6871-73, 7019, Chitau, Jan. 12-15, 1931; 6896, Gauca, Jan. 10, 1931.

6. *Rana bunoderma* Boulenger

Rana bunoderma Boulenger, 1907, Ann. Mag. Nat. Hist., (7) 19, p. 214.

Twenty-eight specimens. Carnegie Museum Nos. 6708-9, 6711-13, 6715, 6737-38, 6824, 6827-33, 6866-67, 6870, 6875-77, 6881-82, 6886-89, Chitau, Jan. 12-16, 1931.

These specimens agree with the original description of *Rana buno-*

derma except for the presence of an outer metatarsal tubercle, and the somewhat ill-defined tympanum. The specimens key out to *bunoderma* in Witte's key to the subgenus *Ptychadena* (Witte, 1921, p. 7).

Males have an extremely well-defined subgular vocal sac, which expands exteriorly through a slit which extends to the base of the arm. The species is readily distinguished from *R. mascareniensis* by the short webbing of the toes and the rounded or elongate dorsal tubercles which take the place of the regular folds of *mascareniensis*.

7. *Rana albolabris* Hallowell

Rana albolabris Hallowell, 1856, Proc. Acad. Nat. Sci. Phila., 1856, p. 153.

Five specimens, Carnegie Museum Nos. 6754-56, 6788, 6793, Chitau, Jan. 12-16, 1931.

8. *Rana tuberculosa* Boulenger

Rana tuberculosa Boulenger, 1882, Cat. Batr. Sal. Brit. Mus., p. 30.

Four specimens, Carnegie Museum Nos. 6862-65, Chitau, Jan. 15, 1931.

Rana cryptotis Boulenger (1907, p. 109) agrees in detail with *tuberculosa* except in its smaller size, hidden tympanum, and subequal first and second fingers. It seems possible that it may prove to be the young of *tuberculosa*.

9. *Rana* sp.

Five specimens, Carnegie Museum Nos. 6669, 6679, 6682, Gauca, Jan. 2-6, 1931; and 7016-17, Chitau, Jan. 11, 1931.

These specimens clearly represent the young of a species of *Rana* not otherwise represented in the collections. It is to be expected that they will be identifiable when more Angolan material becomes available.

10. *Phrynobatrachus natalensis* (Smith)

Stenorhynchus natalensis Smith, 1849, Illustr. Zool. S. Africa, 3, App., p. 23.

Phrynobatrachus natalensis Günther, 1864, Proc. Zool. Soc. London, 1864, p. 480.

One hundred and sixty-five specimens, Carnegie Museum Nos. 6648-57, 6674, 6677-78, 6683-84, 6905-7009, Gauca, Jan. 4-10, 1931; 6710, 6716-18, 6720, 6731-36, 6783-86, 6789-91, 6835-51, 6868, 6878-80, 6883-85, Chitau, Jan. 12-15, 1931; 7023, 7025, Angola, 1931.

11. *Arthroleptis parvulus* Boulenger

Arthroleptis parvulus Boulenger, 1905, Ann. Mag. Nat. Hist., (7) 16, p. 109, pl. 4, fig. 3.

Eighteen specimens, Carnegie Museum Nos. 6721, 6890 (4), 7012-15, 7018, Chitau, Jan. 11-15, 1931; 6675 (5), 7021, Gaucá, Jan. 4-5, 1931; and 7022, 7026, Angola, 1931.

A considerable variation in the dorsal rugosity in this series appears to be due to differences in preservation. I am indebted to Mr. Arthur Loveridge for the identification of this species.

POLYPEDATIDÆ

12. *Leptopelis anchietae* (Bocage)

Hylambates anchietae Bocage, 1873, Jorn. Sci. Lisboa, 4, p. 226.

Leptopelis anchietae Noble, 1924, Bull. Amer. Mus. Nat. Hist., 49, p. 234.

Four specimens, Carnegie Museum Nos. 6696-97, 6729, and 6795, Chitau, Jan. 12-16, 1931.

13. *Leptopelis angolensis* (Bocage)

Hylambates angolensis Bocage, 1893, Jorn. Sci. Lisboa, (2) 3, p. 119; 1895, Herp. Angola, p. 179, pl. 17, fig. 1.

Four specimens, Carnegie Museum Nos. 6695, 6722-23 and 6794, Chitau, Jan. 12-16, 1931.

These specimens agree exactly with Bocage's descriptions and figures of *angolensis*. The species is referred to *Hylambates bocagii* by Boulenger (1906, p. 166), and this species, retained provisionally in the genus *Hylambates* by Noble, (1924, p. 247) has subsequently been referred to *Leptopelis* by Loveridge (1925, p. 787). Until further studies can be made, it is preferable to retain *angolensis* as distinct from *bocagii*, since the original description of *bocagii* differs conspicuously from the specimens at hand.

14. *Hyperolius marmoratus* Rapp

Hyperolius marmoratus Rapp, 1842, Arch Naturg., 8, pt. 1, p. 289, pl. 6.

Four specimens, Carnegie Museum Nos. 6668, 6680, 6688, Gaucá, Jan. 6-8, 1931; 6854, Chitau, Jan. 15, 1931.

Three distinct types of coloration are included in these few specimens, one of which corresponds well with *H. decoratus* Ahl (from

Cameroon) and a second with *H. graueri* Ahl, (from Lake Tanganyika). In the present state of taxonomic confusion in the genus *Hyperolius* it is impossible to come to any satisfactory conclusions regarding the forms deserving of recognition in any given area from laboratory material; but it may be pointed out that these 'varieties' were named long since by Bocage on the basis of Angolan specimens, (Bocage, 1895, p. 164).

15. *Hyperolius nasutus* Günther

Hyperolius nasutus Günther, 1864, Proc. Zool. Soc. London, 1864, p. 482; p. 33, fig. 2.

A single specimen, Carnegie Museum No. 6667, Chitau, Jan. 14, 1931.

This specimen, a male with well-developed vocal sac, measures 19 mm. It exhibits the two dorsolateral light lines mentioned by Bocage (1895, p. 169), as occasionally present in this species.

16. *Hyperolius seabrai* (Ferreira)

Rappia seabrai Ferreira, 1906, Journ. Sci. Lisboa, (2) 7, p. 163, fig.

Three specimens, Carnegie Museum Nos. 6702-3, 6855, Chitau, Jan. 12-15, 1931, are referred here. They are close to *Hyperolius cinnamome-ventris* Bocage, but lack the lateroventral dark line which appears to be very characteristic in specimens of undoubted *cinnamome-ventris* from Cameroon which are available for comparison.

17. *Kassina angeli* Witte.

Cassina angeli Witte, 1933, Rev. Zool. Bot. Afr., 23, p. 172, 1934, Ann. Mus. Congo Belge, Zool., (1) 3, p. 183, pl. 8, fig. 3, pl. 10, fig. 8.

Four specimens, Carnegie Museum Nos. 6646, Gauca, Jan. 8, 1931; and 6730, 6792, 6853, Chitau, Jan. 12-16, 1931.

These specimens agree in their shorter hind limbs with the specimens from the Katanga described by Witte, and females have the curious denticulated anal flaps, which are less well developed in East African *K. senegalensis*. *Kassina modesta* Ahl, described from Natal, is also shorter-legged than the typical *senegalensis*. Without much more South African material, it is impossible to attempt a subspecific rearrangement of the forms of *Kassina*.

LITERATURE CITED

- BOCAGE, J. V. BARBOZA DU.
1895. Herpetologie d'Angola et du Congo. Lisbonne, xx + 203, 19 pl.
- BOULENGER, GEORGE ALBERT.
1906. Report on the batrachians collected by the late L. Fea in West Africa. Ann. Mus. Civ. Stor. Nat. Genova (3) 2, 157-172.
1907. Description of a new frog discovered by Dr. W. J. Ansorge in Mossamedes, Angola. Ann. Mag. Nat. Hist., (7) 20, 109.
- COTT, HUGH B.
1932. On the ecology of tree-frogs in the lower Zambesi Valley. Proc. Zool. Soc. London, 1932, 471-541, 2 pl.
- LOVERIDGE, ARTHUR.
1925. Notes on East African batrachians collected 1920-1923. *Idem.* 1925, 763-791, 2 pl.
1933. Reports on the scientific results of an expedition to the southwestern Highlands of Tanganyika Territory. VII. Herpetology. Bull. Mus. Comp. Zool., 76, 197-416, 3 pl.
- NOBLE, GLADWYN KINGSLEY.
1924. Contributions to the herpetology of the Belgian Congo. III. Amphibia. Bull. Am. Mus. Nat. Hist., 49, 147-347, pl. 23-42.
- PARKER, H. W.
1931. A collection of frogs from Portuguese East Africa. Proc. Zool. Soc. London, 1930 (publ. 1931), 897-905, 1 pl.
- SCHMIDT, KARL P.
1919. Contributions to the herpetology of the Belgian Congo. I. Turtles, crocodiles, lizards, and chameleons. Bull. Am. Mus. Nat. Hist., 39, 385-624, pl. 7-32.
1933. The reptiles of the Pulitzer Angola Expedition. Ann. Carnegie Mus., 22, 1-15, 2 pl.
- WITTE, GASTON-FR. DE.
1921. Description de batraciens nouveaux du Congo Belge. Rev. Zool. Afr., 9, 1-22, 5 pl.